

WHAT IS CLAIMED IS:

1. A gas turbine engine combustor can assembly comprising:

- 5 a combustor can downstream of a pre-mixer;
said pre-mixer having a pre-mixer upstream end,
a pre-mixer downstream end and a pre-mixer flowpath
therebetween, a plurality of circumferentially spaced
10 apart swirling vanes disposed across said pre-mixer
flowpath between said upstream and downstream ends,
and a primary fuel injection means for injecting fuel
into said pre-mixer flowpath;
said combustor can having a combustion chamber
15 surrounded by an annular combustor liner disposed in
supply flow communication with said pre-mixer;
an annular trapped dual vortex cavity located at
said upstream end of said combustor liner and defined
between an annular aft wall, an annular forward wall,
20 and a circular radially outer wall formed
therebetween;
a cavity opening at a radially inner end of said
cavity spaced apart from said radially outer wall and
extending between said aft wall and said forward
wall;
25 air injection first holes in said forward wall
and air injection second holes in said aft wall, said
air injection first and second holes spaced radially
apart; and
fuel injection holes in at least one of said
30 forward and aft walls.

2. A combustor can assembly as claimed in claim 1,
further comprising angled film cooling apertures
disposed through said aft wall, said forward wall,
35 said and outer wall.

3. A combustor can assembly as claimed in claim 2, further comprising said film cooling apertures through said aft walls are angled radially outwardly, said film cooling apertures through said forward
5 walls are angled radially inwardly in a downstream direction, and said film cooling apertures through said outer wall are angled axially forwardly.

4. A combustor can assembly as claimed in claim 2, further comprising said film cooling apertures through said aft walls are angled radially inwardly, said film cooling apertures through said forward
10 walls are angled radially outwardly in a downstream direction, and said film cooling apertures through said outer wall are angled axially aftwardly.

5. A combustor can assembly as claimed in claim 2, wherein each of said fuel injection holes is surrounded by a plurality of said air injection
20 second holes and said air injection first holes are singularly arranged in a circumferential row.

6. A combustor can assembly as claimed in claim 5, further comprising angled film cooling apertures disposed through said aft wall, said forward wall,
25 said and outer wall.

7. A combustor can assembly as claimed in claim 6, further comprising said film cooling apertures through said aft walls are angled radially outwardly, said film cooling apertures through said forward
30 walls are angled radially inwardly in a downstream direction, and said film cooling apertures through said outer wall are angled axially forwardly.

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8. A combustor can assembly as claimed in claim 6, further comprising said film cooling apertures through said aft walls are angled radially inwardly, said film cooling apertures through said forward walls are angled radially outwardly in a downstream direction, and said film cooling apertures through said outer wall are angled axially aftwardly.

9. A combustor can assembly as claimed in claim 1, wherein said primary fuel injection means includes fuel cavities within said swirling vanes, fuel injection holes extending through trailing edges of said swirling vanes from the fuel cavities to said pre-mixer flowpath.

10. A combustor can assembly as claimed in claim 9, further comprising angled film cooling apertures disposed through said aft wall, said forward wall, said and outer wall.

11. A combustor can assembly as claimed in claim 10, further comprising said film cooling apertures through said aft walls are angled radially outwardly, said film cooling apertures through said forward walls are angled radially inwardly in a downstream direction, and said film cooling apertures through said outer wall are angled axially forwardly.

12. A combustor can assembly as claimed in claim 10, further comprising said film cooling apertures through said aft walls are angled radially inwardly, said film cooling apertures through said forward walls are angled radially outwardly in a downstream direction, and said film cooling apertures through said outer wall are angled axially aftwardly.

13. A combustor can assembly as claimed in claim 10,
wherein each of said fuel injection holes is
surrounded by a plurality of said air injection
second holes and said air injection first holes are
5 singularly arranged in a circumferential row.

14. A combustor can assembly as claimed in claim 13,
further comprising angled film cooling apertures
disposed through said aft wall, said forward wall,
10 said and outer wall.

15. A combustor can assembly as claimed in claim 14,
further comprising said film cooling apertures
through said aft walls are angled radially outwardly,
15 said film cooling apertures through said forward
walls are angled radially inwardly in a downstream
direction, and said film cooling apertures through
said outer wall are angled axially forwardly.

20 16. A combustor can assembly as claimed in claim 14,
further comprising said film cooling apertures
through said aft walls are angled radially inwardly,
said film cooling apertures through said forward
walls are angled radially outwardly in a downstream
25 direction, and said film cooling apertures through
said outer wall are angled axially aftwardly.

17. A combustor can assembly as claimed in claim 1,
further comprising:
30 a reverse flow combustor flowpath including, in
downstream serial flow relationship, an aft to
forward portion between an outer flow sleeve and said
annular combustor liner, a 180 degree bend forward of
said vortex cavity, and said pre-mixer flowpath at a
35 downstream end of said combustor flowpath;

said swirling vanes 32 disposed across said pre-mixer flowpath defined between an outer flow sleeve and an inner flow sleeve.

5 18. A combustor can assembly as claimed in claim 17, further comprising:

said film cooling apertures through said aft walls are angled radially inwardly,

10 said film cooling apertures through said forward walls are angled radially outwardly in a downstream direction,

said film cooling apertures through said outer wall are angled axially aftwardly,

15 said fuel injection holes and said air injection second holes are disposed through said forward wall, and

said air injection first holes are disposed through said aft wall.

20 19. A combustor can assembly as claimed in claim 18, wherein said primary fuel injection means includes fuel cavities within said swirling vanes, fuel injection holes extending through trailing edges of said swirling vanes from the fuel cavities to said pre-mixer flowpath.

20. A combustor can assembly as claimed in claim 18, further comprising angled film cooling apertures disposed through said aft wall, said forward wall, 30 said and outer wall.

21. A combustor can assembly as claimed in claim 18, wherein each of said fuel injection holes is surrounded by a plurality of said air injection 35 second holes and said air injection first holes are

singularly arranged in a circumferential row.

22. A combustor can assembly as claimed in claim 2,
further comprising a second stage pre-mixing
5 convoluted mixer located between said pre-mixer and
said vortex cavity and including circumferentially
alternating lobes extending radially inwardly into
said pre-mixer flowpath.
- 10 23. A combustor can assembly as claimed in claim 22,
further comprising angled film cooling apertures
disposed through said aft wall, said forward wall,
said and outer wall.
- 15 24. A combustor can assembly as claimed in claim 23,
further comprising:
said film cooling apertures through said aft
walls are angled radially outwardly,
said film cooling apertures through said forward
20 walls are angled radially inwardly in a downstream
direction,
said film cooling apertures through said outer
wall are angled axially forwardly,
said fuel injection holes and said air injection
25 second holes are disposed through said aft wall, and
said air injection first holes are disposed
through said forward wall.
- 30 25. A combustor can assembly as claimed in claim 24,
wherein each of said fuel injection holes is
surrounded by a plurality of said air injection
second holes and said air injection first holes are
singularly arranged in a circumferential row.